

## Decision support for Web service adaptation

Reference:

A. Papageorgiou, A. Miede, S. Schulte, D. Schuller and R. Steinmetz, "Decision support for Web service adaptation", *Pervasive and Mobile Computing*, vol. 12, Jun. 2014, pp. 197-213.

Abstract:

With the Internet of Services, Web services from all areas of life and business will be offered to service consumers. Even though Web service technologies make it easy to consume services on arbitrary devices due to their platform independence, service messaging is heavyweight. This may cause problems if services are invoked using devices with limited resources, e.g., smartphones. To overcome this issue, several adaptation mechanisms to decrease service messaging have been proposed. However, none of these are the best-performing under all possible system contexts.

In this paper, we present a decision support system that aims at helping an operator to apply appropriate adaptation mechanisms based on the system context. We formulate the corresponding decision problem and present two scoring algorithms—one Quality of Service-based and one Quality of Experience-based.

Missing data and, thus, an incomplete system context is a serious challenge for scoring algorithms. Regarding the problem at hand, missing data may lead to errors with respect to the recommended adaptation mechanisms. To address this challenge, we apply the statistical concept of imputation, i.e., substituting missing data. Based on the evaluation of different imputation algorithms used for one of our scoring algorithms, we show which imputation algorithms significantly decrease the error imposed by the missing data and decide whether imputation algorithms tailored to our scenario should be investigated.